

**Work Order ID 67079**

Monday, March 07, 2011 2:59:41 PM

Page 1

Item ID: D205-634-041G

Accept

Setup Start

Revision ID:

Stop

Item Name: Replacement Skidtube, Grey

Start Date: 3/8/2011 Start Qty: 1.00

Required Date: 3/18/2011 Req'd Qty: 1.00

Cust Item ID:

Customer:



Reference:

Approvals:

Process Plan: mfDate: 11-03-07

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Draw Nbr

Revision Nbr

D2580-041

D- DEO

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile &amp; type labels per PPP D205-634-041 CHG003

Sulas

JG for BG 11-3-18

110

0.00



CNC Bend 1

BENDING MACHINE - SKIDTUBES

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio 16

2-Cut tubes as per Dwg. D2580

3- scribe batch# in aft end of tube

Handwritten signature/initials

11-3-8

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

120

0.00



Skidtubes

Memo

0.00

Skidtubes

1- Deburr ends and remove bending marks

2- Prepare tube for swaging as per QSI 002

130

0.00



QC

QC5- Inspect part completeness to step on W/O

Memo

0.00

Quality Control

Handwritten notes and signatures:

- Signature: *[Signature]*
- Text: 11-3-9
- Text: 1 8 BE 11/03/09

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

140

0.00



Skidtubes

Skidtubes

Memo

0.00

1-Weld step D2576 as per Dwg. D2580 and QSI 004  
A/R□□□ Aluminum Rod

2-Grind welds on step as per Dwg D2580

3-Insert D4202-1 spacer, swage as per QSI002 and trim/ grind flush per QSI002  
and dwg. Hold x-bolt with DT9701 Use tube expander 1/2 x17G to start  
expantion and finish with 1/2 x 18G to achieve dwg dimation.4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64",  
adjust stopper not to hit web. Debur

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Debur

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Debur

150



QC

Quality Control

QC10- Inspect visual per QSI004- ground welds

0.00

Memo

0.00

Suzuki

F60

Pro →

BB 11/03/10

BE 11/03/09

BE 11/03/09

BE 11/03/09

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D205-634-041G PAR #: \_\_\_\_\_ Fault Category: Eng-design NCR: ☒ Yes No DQA: ✓ Date: 11/03/28  
 Resolution: rework Disposition: rework QA: N/C Closed: ✓ Date: 11/03/28

NCR: <u>67079</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>11/03/16</u>	<u>#140</u>	Found that the <del>the</del> cross bolt spacers have cracks. Some large + some small. <u>Be. Pass (swaging)</u> Re: Design. Too thick of x-bolt wall. for swaging.	<u>CP</u> <u>11.03.16</u> <u>DS 042</u>	→ Drill out + remove cracked x-bolt spacers. Weld FROM AFT #18 Replace w/ 1/4" wall D4202-1 <u>11-3-15</u>	<u>DS</u> <u>11/03/17</u>	<u>DS</u> <u>11.03.16</u> <u>DS 042</u>	<u>DS</u> <u>11/03/16</u> <u>DS 042</u>	<u>DS</u> <u>11/03/16</u> <u>DS 042</u>

NOTE: Date &amp; initial all entries

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Item ID: D205-634-041G

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Item Name: Replacement Skidtube, Grey

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Start Date: 3/8/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 3/18/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160  QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo no cracks Band,	0.00 0.00							
170  HandFinish Hand Finishing	Pressure Wash per QSI005 4.3  Memo Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.	0.00 0.00						1 BR 11-3-17.	
180  Powdercoat Powder Coating	Grey Sandtex(Ref:4.3.5.6) per QSI005 4.3  Memo START TIME: 11:25 OVEN TEMPERATURE: 350° FINISH TIME: 11:55.	0.00 0.00						1 BR 11-3-17.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

190

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

1 d 21 11/03/17

POSITIVE RECALL

EFFECTIVE 11.03.16 AUTH CPRELEASED 11.2.17 DATE CPMF  
11-03-18

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Required Date: 3/18/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

200

0.00



HandFinish

Hand Finishing

Memo

0.00

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates

A/R ☐ ☐ ☐ Sikaflex-291 ☐ M1116 040

Sikaflex expire date: 1109

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive

A/R ☐ ☐ ☐ Sikaflex-291 ☐ M1116 040

Sikaflex expire date: 1109

5-Wing Walk as per Dwg D2580 and QSI 005 4.4

Batch: M116402

1 0 0 1103/17

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Start Date: 3/8/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 3/18/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

210



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

*S.ulosics*

Memo

0.00

Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

*(Signature)*

220



Packaging

Packaging

Packaging

0.00

Memo

0.00

Identify and pack for shipping as per PPPD205-634-041

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

*11/03/18*

230



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

*11/03/18**MF**11-03-18*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

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Page 1

Work Order ID: 67079

Parent Item: D205-634-041G

Parent Item Name: Replacement Skidtube, Grey




Start Date: 3/8/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A 11.03.07 new issue DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D4202-1  Spacer		Manufactured	No			140	Each	240.0000	20	20		BE 11/03/09	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG		240							
					65529	26							
					66121	214							
D2580-1  205 Skidtube bent detail		Manufactured	No			110	Each	11.0000	1	1			
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG	66728	11							
					59856	1							
					65509	5							
					65510	4							
					65511	1							
D2576-3  Step (maching detail)		Manufactured	No			140	Each	40.0000	1	1		BE 11/03/09	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG		40							
					52215	40							

W/O:		WORK ORDER CHANGES						
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Page 2

Work Order ID: 67079

Parent Item: D205-634-041G

Parent Item Name: Replacement Skidtube, Grey

Start Date: 3/8/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

D2855

Manufactured No

200

Each

85.0000

1

1



Cap



3/11/03/17

Location

Loc Qty

Loc Code

FP6

1

1367373

56613

1

fp7

12

65519

12

ST024

72

50513

1

50770

28

51539

2

53791

6

65569

35

x1

AN3-5A

Purchased No

200

Each

699.0000

2

2



Bolt



3/11/03/17

Location

Loc Qty

Loc Code

ST350

699

115016

33

115371

500

116632

166

x2

AN960JD10L

NAS1149D0332J

Purchased No

200

Each

4.0000

2

2



Washer



3/11/03/17

Location

Loc Qty

Loc Code

ST335

4

11912

4

1117010

x2

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Shop Packet Print

Page 2

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Start Date: 3/8/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

ALS7-1032-130

Purchased

No

200

Each

1,570.000

50

50



2/11/03/17

Insert

Location

Loc Qty

Loc Code

FP

21

1A116864

V50

115079

21

ST282

1549

111529

32

113238

17

115502

500

116800

1000

AN3C4A

Purchased

No

200

Each

2,361.000

50

50



2/11/03/17

BOLT

Location

Loc Qty

Loc Code

ST350

2361

115300

25

116075

337

116704

314

116924

1200

117010

485

X50

AN960C10L

NAS1149C0332  
R

Purchased

No

200

Each

61.0000

50

50



2/11/03/17

washer

Location

Loc Qty

Loc Code

ST245

61

107534

59

108246

2

V50

1A116304

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Shop Packet Print

Page 3

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Parent Item Name: Replacement Skidtube, Grey

Start Date: 3/8/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

D3566-13

Manufactured No

200 Each

58.0000

1

1



Gasket



yl 11/03/17

Location

Loc Qty

Loc Code

FP011

36

66550

36

FP014

22

64070

5

66137

17

yl

D3566-5

Manufactured No

200 Each

37.0000

1

1



Gasket



yl 11/03/17

Location

Loc Qty

Loc Code

FP015

37

63574

1

65528

13

66146

3

66552

20

yl

D3566-1

Manufactured No

200 Each

56.0000

2

2



Gasket



yl 11/03/17

Location

Loc Qty

Loc Code

FP

20

66548

20

FP011

19

65525

19

FP015

17

57715

1

66040

15

66129

1

yl

W/O:		WORK ORDER CHANGES					
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Start Qty: 1.00

Required Qty: 1.00

D3564-11      Manufactured      No      200      Each      16.0000      1      1  
  
Wearshoe

Location

Loc Qty

Loc Code

FP019

16

B66154

65159

2

66554

14

X1

D3564-13      Manufactured      No      200      Each      45.0000      1      1  
  
Wearshoe

Location

Loc Qty

Loc Code

FP16

22

65522

4

66549

18

FP17

23


59660

1

66136

22

X1

D3564-9      Manufactured      No      200      Each      17.0000      1      1  
  
Wearshoe

Location

Loc Qty

Loc Code

FP

1

55334

1

FP019

15

66153

15

FP19

1

62238

1

B65524

X1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Picklist Print

Monday, March 07, 2011 2:59:36 PM

Page 6

Work Order ID: 67079

Parent Item: D205-634-041G

Parent Item Name: Replacement Skidtube, Grey

Start Date: 3/8/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

D3564-5

Manufactured No

200

Each

41.0000

1

1



Wearshoe



(X) 11/03/17

Location

Loc Qty

Loc Code

FG

1

34806

1

FP19

24

57525

1

58709

1

66551

22

FP-19

16

63575

1

66148

15

X1

D2594-3

Manufactured No

200

Each

919.0000

16

16



O-Ring, 205 Skidtube



11/03/12

Location

Loc Qty

Loc Code

FP

543

55546

19

58191

12

59358

12

65518

500

fpa

376

61762

376

X16

Monday, March 07, 2011 2:59:36 PM

Shop Packet Print

Page 6

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

# Picklist Print

Page 7

Monday, March 07, 2011 2:59:36 PM

Work Order ID: 67079



Parent Item: D205-634-041G



Parent Item Name: Replacement Skidtube, Grey

Start Date: 3/8/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

D2594-1

Manufactured No

200

Each

648.0000

16

16



Handwritten: 16

Handwritten: 3/10/11

Plug, 205 Skidtube

Location

Loc Qty

Loc Code

FP	483
42807	112
55002	71
66122	300
FP14	165
58434	15
65512	85
65980	65

Handwritten: 1367379

Handwritten: x16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**DART****RELEASED**  
07.06.28 #**DEO ATTACHED**

DESIGN #	DRAWN BY RH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED #	APPROVED #	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

**GENERAL NOTES:**

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:  
SEE NOTES ON  
PAGE 2 FOR D2580-041 AND  
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

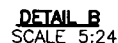
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

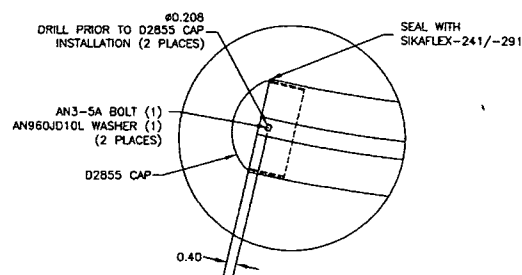
D2580-1 DRILLING DETAIL



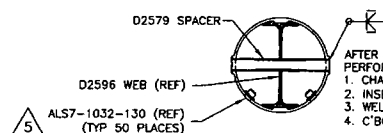
RELEASED  
07-06-28

DEO ATTACHED

**DETAIL C**  
SCALE 5:24



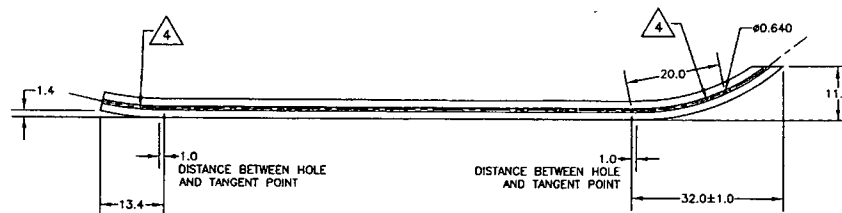
**SECTION D-D**  
SCALE 5:24



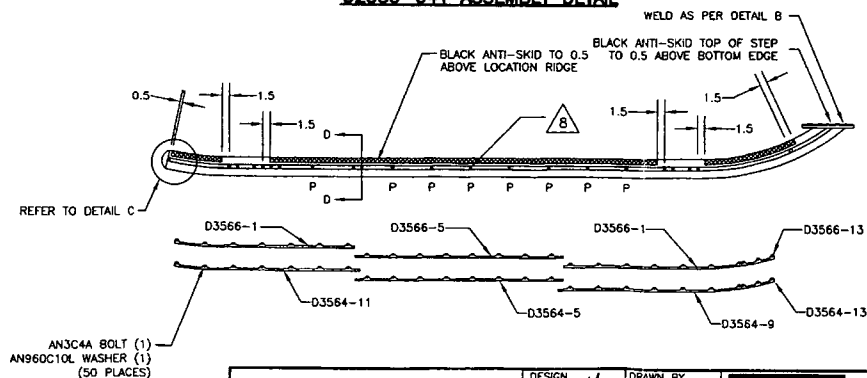
AFTER DRILLING AND BENDING ASSEMBLY  
PERFORM THE FOLLOWING FOR Ø0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO Ø0.437 X 1.00 DEEP

D2580-1 BENDING AND CUTTING DETAIL



D2580-041 ASSEMBLY DETAIL



**D2580-041 NOTES**

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

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DART AEROSPACE LTD.

DESIGN
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DRAWN BY

**CHECKE**

APPROVED

DATE \_\_\_\_\_

\_\_\_\_\_

07.02.27

**DART**

**DART AEROSPACE LTD.**  
HAMMERSBURY, ONTARIO, CANADA

DRAWING NO.

85

D2580

SHEET 2 OF 3

TITLE
-------

SCALE

205 SKIDTUBE ASSEMBLY

1:24

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

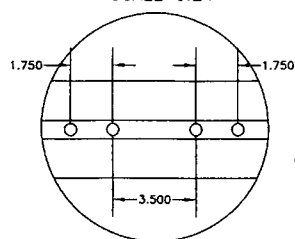
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

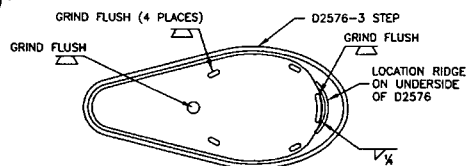


**DETAIL E**  
SCALE 5:24

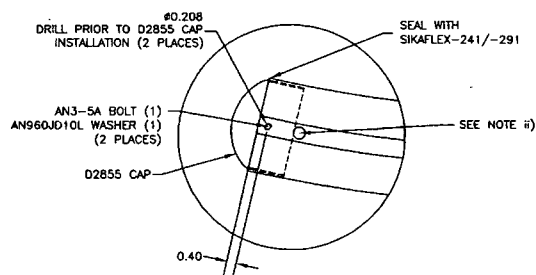


**RELEASED**  
67-28-28

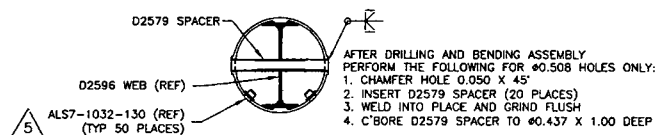
**DETAIL F**  
SCALE 5:24



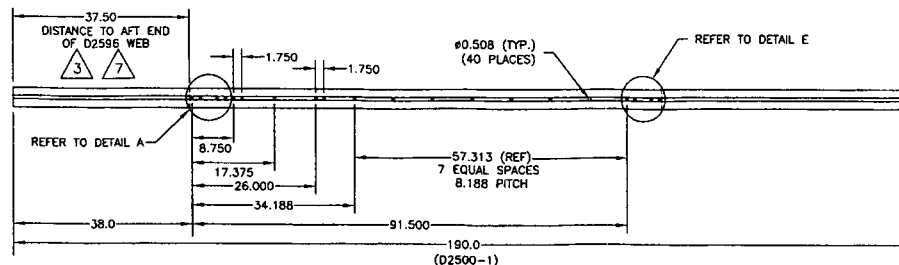
**DETAIL G**  
SCALE 5:24



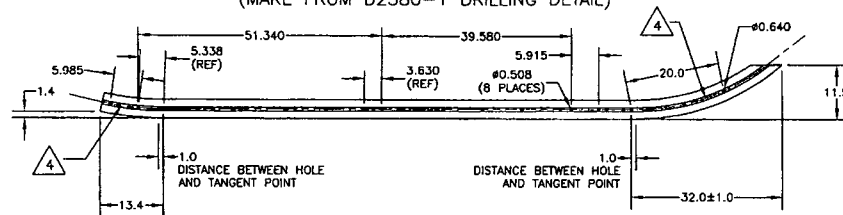
**SECTION H-H**  
SCALE 5:24



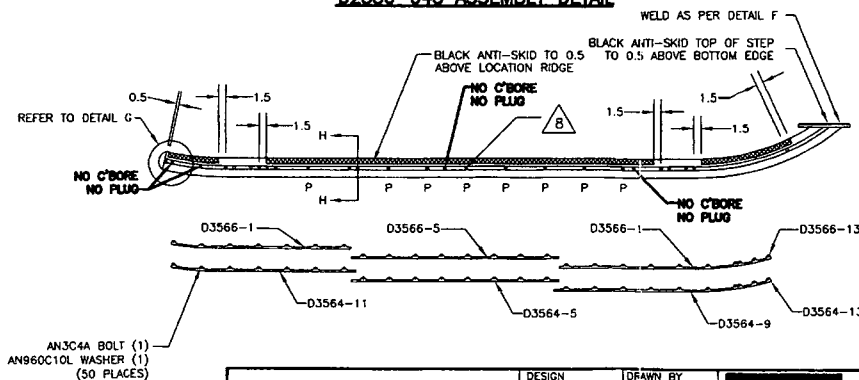
**D2580-1 DRILLING DETAIL**



**D2580-5 BENDING AND CUTTING DETAIL**  
(MAKE FROM D2580-1 DRILLING DETAIL)



**D2580-045 ASSEMBLY DETAIL**



**D2580-045 NOTES**

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB  
POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3  
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE WITH THE SPACER AT THIS LOCATION

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DESIGN RH	DRAWN BY RH	<b>DART</b> DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA	REV. 0
CHECKED H	APPROVED H	DRAWING NO. D2580	SHEET 3 OF 3
DATE 07.02.27	TITLE 205 SKIDTUBE ASSEMBLY	SCALE 1:24	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DRAWING NO. D2580	TITLE 205 SKIDTUBE ASSEMBLY	REV. D	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D2580-D-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>UP</i>	CHECKED <i>L</i>	MFG. APPR. <i>R</i>	APPROVED <i>MP</i>		DE APPR. <i>MP</i>		
DATE 10.09.22	DATE 10.11.04	DATE 10.11.04	DATE 10/11/04		DATE 10.11.04		

**PURPOSE:**

CHANGE ALL WELDED CROSSBOLT SPACERS TO SWAGED SPACERS

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

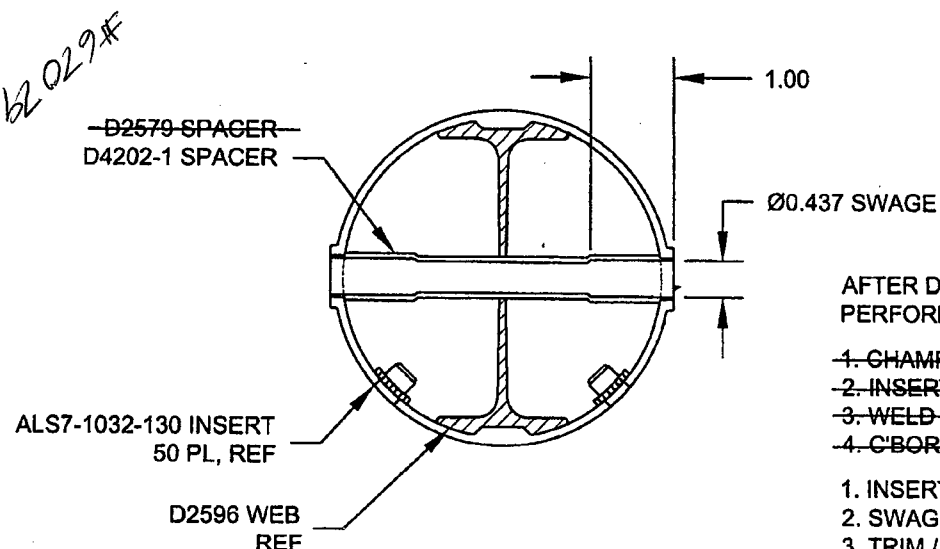
WAS

QTY	QTY	PART NUMBER	DESCRIPTION
-041	-045		
20	24	D2579	CROSS BOLT SPACER

IS

20	24	D4202-1	SPACER
----	----	---------	--------

SECTION D-D & SECTION H-H ARE AMENDED AS FOLLOWS:



**RELEASED**  
2010-11-18  
*MP*

AFTER DRILLING AND BENDING ASSEMBLY  
PERFORM THE FOLLOWING FOR Ø0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO Ø0.437 X 1.00 DEEP

1. INSERT D4202-1 SPACER, 20 PL (-041) OR 24 PL (-045)
2. SWAGE TO Ø0.437 X 1.00 DEEP PER QSI 002
3. TRIM / GRIND FLUSH PER QSI 002

**SECTION D-D**  
NOT TO SCALE

**SECTION H-H**  
NOT TO SCALE

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

## Chris Provencal

---

**From:** David Shepherd <dshepherd@dartaero.com>  
**Sent:** March 16, 2011 6:21 PM  
**To:** 'Chris Provencal'  
**Cc:** 'Mike Petsche'; 'Linda Lacelle'; 'Bill Beckett'  
**Subject:** RE: 0.049 Wall Xbolt Spacers

Chris,

The substitution is acceptable. However, I would still like to see that this is repeatable. Per my earlier suggestion, I assume production is building a couple of tubes with 0.049 wall crossbolt spacers to verify that there is no cracking after several swagings???

David

---

**From:** Chris Provencal [mailto:cprovencal@dartaero.com]  
**Sent:** Wednesday, March 16, 2011 9:14 AM  
**To:** David Shepherd  
**Cc:** Mike Petsche  
**Subject:** 0.049 Wall Xbolt Spacers

David,

To approve the re-worked xbolt spacers, I'd need to attach an email from you giving OK to substitute the 0.058" wall crossbolt spacers with 0.049" wall crossbolt spacers. The crossbolt spacers are otherwise made to D4202 Rev. A.

The justification would be the initial testing, as recorded in the original design review, which showed that 0.049" wall xbolt spacers were stronger than welded/c-bored crossbolt spacers. These finding were confirmed when we tested another batch of swaged vs welded samples yesterday (March 15<sup>th</sup>, 2011).

Chris